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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/630,054	07/30/2003	Yuemei Yang	3006.001300/KDG	8193
23720	7590	10/23/2006	EXAMINER	
WILLIAMS, MORGAN & AMERSON 10333 RICHMOND, SUITE 1100 HOUSTON, TX 77042			HENDRICKSON, STUART L	
			ART UNIT	PAPER NUMBER
			1754	
DATE MAILED: 10/23/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/630,054

Applicant(s)

YANG ET AL.

Examiner

Stuart Hendrickson

Art Unit

1754

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 9/5/06.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-219, 230-234 and 236-311 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-219, 230-234, 236-311 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-16, 20-53, 230-234, 236-246, 252-291 are rejected under 35 U.S.C. 103(a) as being unpatentable over Resasco et al. (6,413,487).

Resasco teaches method for producing single-wall carbon nanotubes using a supported bi-metal catalyst of at least one metal from both group VIIIB and VIB. Iron, Co, & Mo are all taught as catalytic metals on MgO (see claim 23). Resasco teaches the claimed ratios of metals, reducing the metal with hydrogen before contacting, and teaches contacting the catalyst with methane with hydrogen for a short period of time at the claimed temperatures to produce substantially pure single-wall nanotubes, then using HCl to remove the catalyst. While Resasco does not teach the same method of combusting precursors of the catalytic metals, the resulting product appears to be the same. It has been held that the process does not, *per se*, impart patentability of the product (see MPEP § 2113). The burden is upon the applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. Applicant arguments are not a substitute for factual evidence.

With regard to process parameters that are not explicitly taught (reaction time for example), such parameters are known to those of ordinary skill in the art to be optimizable based on the desired product. In addition, Resasco clearly teaches (Column 3 contains one of several examples) that many of the variables can be varied for different products not explicitly taught. Concerning the 'solid solution' limitation added, using it is an obvious expedient to use a solid solution in order to provide the metals recited in the reference.

1. Claims 17-20, 78-125, 150-195, & 247-251 are rejected under 35 U.S.C. 103(a) as being unpatentable over Resasco et al. as applied above in view of Smalley et al. (6,761,870).

Resasco does not teach sulfiding the catalyst. Smalley teaches a method of making single-wall carbon nanotubes using the same catalytic metals (bottom of column 3) as catalyst particles, but does not use a support. The nanotube growth step of Smalley is similar to that of

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Resasco in the use of temperature, feedstock, and resulting purity, among other analogous properties. Smalley teaches using thiophene and H<sub>2</sub>S as sulfiding agents. It would have been obvious to one of ordinary skill in the art to use these agents in the process of Resasco in order to, as Smalley teaches, fine tune the activity of the catalyst (Column 13, first paragraph).

It is noted that claim 78 (for example) does not appear to differ from a catalyst on a support.

2. Claims 54-77, 126-149, 196-219 & 292-311 are rejected under 35 U.S.C. 103(a) as being unpatentable over Resasco et al. & Smalley et al. as applied above, and further in view of Yamada et al. (5,102,647).

Neither Resasco nor Smalley teach using fluidizing aid particles in the reactor. Yamada teaches a process for growing carbon fibers on catalyst particles while using ceramic particles as a fluidizing aid. Yamada teaches several ways of using the particles and teaches removing them separately and recycling them for reuse. Yamada also teaches using a counter-current flow method in the reactor. It would have been obvious for one of ordinary skill in the art at the time of the invention to use the ceramic particles in the processes of Resasco & Smalley in order to detangle the nanotubes and/or improve heat dispersion of the reaction as taught by Yamada, and to use counter-current flow to increase the interaction of the reactants and catalyst particles. The different variations of the claims are obvious variations that one of ordinary skill in the reactor apparatus and fluidizing aid art would recognize as obvious and are not seen as patentably distinct.

### ***Response to Arguments***

Applicant's arguments filed 9/5/06 have been fully considered but they are not persuasive.

It appears that the phrase 'solid support' is argued as not taught, since the references teach the metals. This has been addressed above. Claim 78 does not distinguish, because the claims recite catalyst on support, as per the references. In so far as there is a difference, the claimed arrangement is obvious, see above.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication should be directed to examiner Hendrickson at telephone number (571) 272-1351.

A handwritten signature in black ink, appearing to read 'Stuart Hendrickson', is positioned above the printed name.

Stuart Hendrickson  
examiner Art Unit 1754